



**Tier 2 Site Cleanup Report**  
**Leaking Underground Storage Tank Site Assessment**  
**for the Iowa Department of Natural Resources**

**SITE IDENTIFICATION**

LUST No.

UST Registration No.

Site Name:

Site Address:

City:

**RESPONSIBLE PARTY IDENTIFICATION**

Name:

Street:

City:

State:

Zip Code:

Classification: ☐ High Risk ☐ Low Risk ☐ No Action Required

Recommend: ☐ Tier 3 ☐ Corrective Action

Is this a revised Tier 2 SCR? ☐ Yes ☐ No

**STATEMENT OF CERTIFICATION**

I, \_\_\_\_\_, Groundwater Professional Certification No. \_\_\_\_\_, am familiar with all applicable requirements of Iowa Code § 455B.474 and all rules and procedures adopted thereunder including, but not limited to, the Department of Natural Resources' Tier 2 guidance. Based on my knowledge of those documents and information I have prepared and reviewed regarding this site, UST Registration No. \_\_\_\_\_, LUST No. \_\_\_\_\_, I certify that this document is complete and accurate as provided in 567 IAC 135.10(11) and meets the applicable requirements of the Tier 2 Site Cleanup Report.

Print: Name/Address/Phone # of Certified Groundwater Professional

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

Phone: \_\_\_\_\_

Date (Sent/Given to Responsible Party): \_\_\_\_\_

I certify that I have reviewed this document, appendices and attachments for submittal to the Iowa Department of Natural Resources. To the best of my knowledge, the site history and scaled site plan are accurate.

Print Name of Responsible Party

Signature - Responsible Party

Date (Sent/Given to IDNR)

**Official IDNR Use Only**

Date Received:

Comment Letter Date:

Reviewer:

Approved:

 Y ☐ N ☐

## TIER 2 REPORT CHECKLIST

Printed from the software

<input type="checkbox"/> Report Cover Sheet. Signed by certified groundwater professional and responsible party. ....	1
<input type="checkbox"/> Tier 2 Report Checklist .....	2

### Summary Sheets:

<input type="checkbox"/> Tier 2 Data Before Modeling .....	4
<input type="checkbox"/> Site Hydrogeology .....	5
<input type="checkbox"/> Preliminary Pathway Evaluation Requirements .....	6
<input type="checkbox"/> Tier 2 Receptor Summary .....	7

### Report Body:

<input type="checkbox"/> Sampling Results ( pages 10-12) .....	9
<input type="checkbox"/> Receptor Survey -- Groundwater Well Survey.....	14
<input type="checkbox"/> Receptor Survey -- Affected Property Owner Table.....	15
<input type="checkbox"/> Receptor Survey -- Commingled Plume Discussion .....	16
<input type="checkbox"/> Receptor Survey -- Off-Site Contamination Source Support Discussion .....	16
<input type="checkbox"/> Free Product.....	16
<input type="checkbox"/> Receptor Survey -- Enclosed Space Survey.....	17
<input type="checkbox"/> Receptor Survey -- Surface Water Survey .....	18
<input type="checkbox"/> Risk Justification and Corrective Action Proposed.....	19
<input type="checkbox"/> Monitoring Plan.....	21


### Pathway Assessment Attachments:


**Groundwater Pathways:** If a receptor type must be evaluated, check the box at the left and include the Receptor ID (Identification) Map. If any potential or actual receptors are identified by the Receptor ID Map, the Receptor Evaluation Map (for each applicable chemical for each receptor) and SSTL Table (for each receptor) must be provided in the corresponding appendix. Check the boxes in the table for those items attached.

Pathway	Receptor ID Map	Receptor Evaluation Map						SSTL Tables
		B	T	E	X	D	WO	
<input type="checkbox"/> 1a. GW Ingestion - Drinking Water Wells								
<input type="checkbox"/> 1b. GW Ingestion - Nondrinking Water Wells								
<input type="checkbox"/> 2. GW Ingestion - Protected GW Source								
<input type="checkbox"/> 3a. GW Vapor - Confined Space Residential								
<input type="checkbox"/> 3b. GW Vapor - Confined Space Nonresidential								
<input type="checkbox"/> 4. GW Vapor - Potential Confined Space								
<input type="checkbox"/> 5a. GW Vapor - Sanitary Sewer Residential								
<input type="checkbox"/> 5b. GW Vapor - Sanitary Sewer Nonresidential								
<input type="checkbox"/> 6. GW Vapor - Potential Sanitary Sewer								
<input type="checkbox"/> 7. GW to Plastic Water Line								
<input type="checkbox"/> 8. Surface Water								

**Soil Leaching Pathways:** Check the box at the left if this receptor type must be evaluated. The Receptor ID (Identification) Map and Soil SSTL Table (for each receptor) must be provided in the corresponding appendix.

Pathway	Receptor ID Map	Soil SSTL Table
<input type="checkbox"/> 9-1a. Soil Leaching to GW Ingestion - Drinking Water Wells		
<input type="checkbox"/> 9-1b. Soil Leaching to GW Ingestion - Nondrinking Water Wells		
<input type="checkbox"/> 9-2. Soil Leaching to GW Ingestion - Protected GW Source		
<input type="checkbox"/> 9-3a. Soil Leaching to GW Vapor - Confined Space Residential		
<input type="checkbox"/> 9-3b. Soil Leaching to GW Vapor - Confined Space Nonresidential		
<input type="checkbox"/> 9-4. Soil Leaching to GW Vapor - Potential Confined Space		
<input type="checkbox"/> 9-5a. Soil Leaching to GW Vapor - Sanitary Sewer Residential		
<input type="checkbox"/> 9-5b. Soil Leaching to GW Vapor - Sanitary Sewer Nonresidential		
<input type="checkbox"/> 9-6. Soil Leaching to GW Vapor - Potential Sanitary Sewer		
<input type="checkbox"/> 9-7. Soil Leaching to GW to Plastic Water Line		
<input type="checkbox"/> 9-8. Soil Leaching to Surface Water		


☐ 10.  Soil Vapor to Enclosed Space. If this pathway must be evaluated, check the box at the left and provide the Soil Vapor Map.


☐ 11.  Soil to Plastic Water Line. If this pathway must be evaluated, check the box at the left and provide the Soil to Plastic Water Line Map.

**Bedrock Pathway Assessment Attachments:**

☐ A. Justification for Bedrock Type


☐ B. Hydrogeologic Cross-section

☐ C.  Hydraulic Conductivity and Total Dissolved Solids Table(s)

 Pathway	B	T	E	X	TEH - D	TEH - WO
<input type="checkbox"/> 1. GW Ingestion - Actual Map						
<input type="checkbox"/> 2. GW Ingestion - Potential Map						
<input type="checkbox"/> 3. Soil Gas Plume Map						
<input type="checkbox"/> 7. GW to Plastic Water Line Map						
<input type="checkbox"/> 8. Surface Water Map						
<input type="checkbox"/> 9. Soil Leaching Map						
<input type="checkbox"/> 10. Soil Vapor Map						
<input type="checkbox"/> 11. Soil to Plastic Water Line Map						

**Other Maps:**

☐ 12.  Groundwater Summary Corrective Action Map


☐ 13.  Soil Summary Corrective Action Map


☐ 14. Monitoring Plan Map

☐ 15. Landowner Map

☐ 16. X, Y Coordinates Map (on a Site Map)

☐ 17. Zoning Documentation

☐ 18.  Groundwater Source Width/Length Map

☐ 19.  Soil Source Width/Length Map

☐ 20.  Soil Contamination Plume Map

☐ 21.  Groundwater Contamination Plume Map

☐ 22. Groundwater Flow Direction Map

☐ 23. Well Survey Map

☐ 24. Enclosed Space and Conduit Map

☐ 25. Surface Water Map

**Other Appendices:**

☐ 26. Laboratory Data Sheets / Chromatograms

☐ 27. Construction Diagrams for Soil Vapor Mon. Wells

☐ 28. Soil Boring Logs/Mon. Well Construction Diagrams

☐ 29. Well Logs (drinking and non-drinking water wells)

☐ 30. Off-Site Contamination Source Support Data

☐ 31. Tier 1 Selected Information

☐ Pages 5, 6 and 10 of the Report Body

☐ Appendix 1 - Topographic Site Map

☐ Appendix 4 - Field Screening Map

☐ App. 11 - Tank Tightness Test Results

☐ Appendix 14 - "K" Measurements

☐ **32. Corrective Action Documentation - *optional***

☐ Declaration of Restrictive Covenants / Institutional Controls

☐ Abandoned Water Well Plugging Record(s)

☐ Water Supply (IDNR) / Designated County Agent Notification

☐ Report of Plastic Water Line Removal and / or Relocation

☐ Utility Company Notification

☐ Sanitary Sewer Notification

☐ Report of Excavation Activities and, if applicable, completed Land Application Notification Form.

☐ **Computer Disk**

## TIER 2 DATA BEFORE MODELING

LUST# \_\_\_\_\_

Free Product Present?	Groundwater encountered?	SCR conversion?
TEH-diesel required?	TEH-waste oil required?	Bedrock:

Analytical Data							
Groundwater Maximums				Soil Maximums			
	Date	B/ MW #	Concentration (µg/L)		Date	B/ MW #	Concentration (mg/kg)
B				B			
T				T			
E				E			
X				X			
TEH <sub>d</sub>				TEH <sub>d</sub>			
TEH <sub>wo</sub>				TEH <sub>wo</sub>			

Soil Gas	Benzene		Toluene		Ethylbenzene		TEH <sub>d</sub>	
	Sampled Soil Gas	Result	Sampled Soil Gas	Result	Sampled Soil Gas	Result	Sampled Soil Gas	Result
Soil Source								
Groundwater Source								

Initial Receptor Evaluation		
Groundwater Ingestion--Actual	Water supply well survey within 1,000 feet?    Y / N	
	Drinking water wells within 1,000 feet?    Y / N / U	
	Non-drinking water wells within 1,000 feet?    Y /N / U	
Groundwater Ingestion--Potential	Protected groundwater source?    Y / N	Maximum K:            m/d
	Institutional control within 1,000 ft.?    Y / N	Minimum TDS:        mg/L
Vapors	Explosive vapor levels during most recent investigation?    Y / N	
	Institutional control within 500 feet?    Y / N	
Plastic water lines	Shallowest depth to groundwater?    feet	
	Plastic water line within 200 feet of source?    Y/N/U	
Surface water	Designated use segment within 500 feet?    Y/N/U	Designation(s):
	Any surface water within 200 feet?    Y/N	Pass visual inspection?    Y/N

LUST No: \_\_\_\_\_

Site Name: \_\_\_\_\_

### **Site Hydrogeology**

#### **Flow / Migration**

Head gradient (i, ft/ft)	_____
Hydraulic conductivity (K, m/day)	_____
MAIN PLUME / FLOW (degrees)	_____
RANGE of Plume / FLOW (degrees)	_____
Upgradient (fraction)	_____

#### **Source Dimensions**

Groundwater Plume Source Width (Sw - GW) (ft)	_____
Soil Plume Source Width (Sw - Soil) (ft)	_____
Groundwater Plume Source Length (W - GW) (ft)	_____
Soil Plume Source Length (W - Soil) (ft)	_____

#### **Soil Parameters**

#### **Default**

Fraction organic carbon (foc) (g-C/g-Soil)	_____	0.01
Total Porosity (Qt) (cm <sup>3</sup> /cm <sup>3</sup> -Soil)	_____	0.3
Soil bulk density (ps) (g/cm <sup>3</sup> -Soil)	_____	1.86

**Tier 2 Data Before Modeling Justification Section.** Justification must be provided if diesel and/or waste oil was stored at the site and the answer given for the following questions is "No": "TEH-diesel required?" and/or "TEH-waste oil required?". Justification must also be provided if the answer to "Groundwater encountered?" was answered "No" or anytime an answer given may not be obvious to the IDNR.

**Site Hydrogeology Justification Section.** Explain which points were used to determine the gradient at the site. If necessary for clarification, provide justification for the variables used in the Site Hydrogeology section here.

## PRELIMINARY PATHWAY EVALUATION REQUIREMENTS

**X = Evaluation Required** (A receptor identification plume must be generated.)

Pathway	Receptor Type	B	T	E	X	TEH <sub>d</sub>	TEH <sub>wo</sub>
<b>Groundwater Pathways</b>							
Groundwater Ingestion	Drinking Water Wells-DWW						
	Nondrinking Water Wells- NDWW						
	Protected Groundwater Source-PGWS						
Groundwater Vapor to Enclosed Space	Confined Space Residential-CSR						
	Confined Space Nonresidential-CSNR						
	Sanitary Sewer Residential-SSR						
	Sanitary Sewer Nonresidential-SSNR						
Groundwater to Plastic Water Line	Plastic Water Lines (PWL)						
Surface Water	DU-Cold Water-B(CW)						
	DU-Warm Water-B(WW)						
	DU-Limited Resources-B(LR)						
	DU-Lakes & Wetlands-B(LW)						
	DU-Drinking Water-C						
	AT-All Surface Water						
	AT-Ponds & Lakes						
	State-Owned Lake						
<b>Soil Leaching Pathways</b>							
Soil Leaching to Groundwater Ingestion	Drinking Water Wells-DWW						
	Nondrinking Water Wells-NDWW						
	Protected Groundwater Source-PGWS						
Soil Leaching to Groundwater Vapor to Enclosed Space	Confined Space Residential-CSR						
	Confined Space Nonresidential-CSNR						
	Sanitary Sewer Residential-SSR						
	Sanitary Sewer Nonresidential-SSNR						
Soil Leaching-Groundwater to Plastic Water Line	Plastic Water Lines (PWL)						
Soil Leaching to Surface Water	DU-Cold Water-B(CW)						
	DU-Warm Water-B(WW)						
	DU-Limited Resources-B(LR)						
	DU-Lakes & Wetlands-B(LW)						
	DU-Drinking Water-C						
	AT-All Surface Water						
	AT-Ponds & Lakes						
	State-Owned Lake						
<b>Other Soil Pathways</b>							
Soil Vapor to Enclosed Space	Confined Space Residential-CSR						
	Confined Space Nonresidential-CSNR						
	Sanitary Sewer Residential-SSR						
	Sanitary Sewer Nonresidential-SSNR						
Soil to Plastic Water Line	Plastic Water Lines (PWL)						

TIER 2 RECEPTOR SUMMARY														
Pathway	Receptor			RISK: H / L / N							C	Corrective Action(s) Completed	Current Risk	To Tier 3
				Group 1				TEH						
	Name	A	P	B	T	E	X	D	W					
Groundwater Ingestion—Actual														
Groundwater Ingestion—Potential														
Groundwater Vapor To Enclosed Space														
Soil Vapor to Enclosed Space														
Groundwater To Plastic Water Line														
Soil To Plastic Water Line														
Surface Water														

Corrective Actions:

1. Plugged drinking water wells

2. Plugged non-drinking water wells

3. Notified IDNR Water Supply Section

4. Notified designated county authority

5. Notified sanitary sewer public authority

6. Notified utility company-plastic water line

7. Relocated plastic water lines

8. Replaced plastic water lines

9. Established institutional controls

10. Conducted soil excavation

11. Cleared with soil gas

TIER 2 RECEPTOR SUMMARY (continued)
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[illegible]

**Corrective Actions:**

5. Notified sanitary sewer public authority
6. Notified utility company-plastic water line
7. Relocated plastic water lines
8. Replaced plastic water lines

9. Established institutional controls  
10. Conducted soil excavation  
11. Cleared with soil gas

### Corrective Action Summary:



## Sampling Results:

Field Screening Results							
<p>Complete the table below with the field screening results for each boring, monitoring well, and probe point location. In the first column provide the depth increments over which vapor screening was conducted beginning with the ground surface. Label the increments and total depth of boring in units of feet from the ground surface. Place an asterisk (*) at the depth on each column for every soil sample analyzed. Place a water level symbol (v) at the depth on each column to represent the static water level. This page may be duplicated for additional sampling points.</p>							
Sample Identification	Example						
Date Sampled	10/23/96						
Depth of Reading -	depth						
- Ground Surface	0	0					
-	1'	0					
	2	10					
	3	21					
	4	25					
	5	24					
	6	29					
	7	90					
	8	120					
	9	*400					
	10	v300					
	11	180					
	12	20					
	13	0					
	14	0					
	15	0					
Total Depth of Boring	15'						
<p><b>Soil Boring and Monitoring Well Placement.</b> Describe soil and groundwater sampling methods. Explain why those samples selected for laboratory analysis represent the highest contamination concentrations encountered during soil boring / monitoring well installation. Explain why the source(s) has been adequately investigated. If groundwater samples were obtained from wells with free product, describe the method used to collect the samples.</p>							

Soil Analytical Data (mg/kg)												
Boring/ Well #	Date Sampled	Elevations (ASL)			Group 1				Group 2			
		Ground Surface	Sample Depth	SWL	B	T	E	X	TEH-D	TEH-WO	Naph.	TPH
MW9999	99/99/99	9999.99	9999.99	9999.99	999,999	999,999	999,999	999,999	999,999	999,999	999,999	999,999
	99-99-99											





Groundwater Analytical Data (µg/L)														
Boring/ Well #	Date Sampled	Elevations (ASL)				Group 1				Group 2			FP	FP
		Ground	TOC	TOS	SWL	B	T	E	X	TEH-D	TEH-WO	Naph.	Type	Default?
MW999	99/99/99	9999.99	9999.99	9999.99	9999.99	999,999	999,999	999,999	999,999	999,999	999,999	99,999	WO	YES
													G	NO
													D	Y
													U	N
													N	





Soil Gas Analytical Data							
Complete the table below with soil gas analytical data for each vapor sampling point. Group sampling events by location then arrange chronologically with the oldest data first.							
Sample Label	Receptor Evaluated	Date Sampled	Elevations (feet Above Sea Level)			Benzene ( $\mu\text{g}/\text{m}^3$ )	Toluene ( $\mu\text{g}/\text{m}^3$ )
			Ground Surface	Soil Vapor Sample	Static Groundwater		

**Soil Gas Sampling Methods.** If soil gas measurements were taken, describe the soil gas sampling methods and explain why the methods provide representative samples. Attach construction diagrams for each soil vapor monitoring well (Appendix 27).

**Soil Gas Sampling Location Justification.** Explain why the location of each vapor sample is adequate for evaluating the identified actual receptors. Indicate which chemicals of concern exceed soil and groundwater target levels, and whether the source locations have been evaluated as potential receptors using soil gas results.

Indoor Vapor Analytical Data						
Complete the table below with indoor vapor analytical data for each enclosed space receptor sampled. Group sampling events by location then arrange chronologically with the oldest data first.						
Receptor Evaluated	Date Sampled	Elevations (feet Above Sea Level)			Benzene ( $\mu\text{g}/\text{m}^3$ )	Toluene ( $\mu\text{g}/\text{m}^3$ )
		Ground Surface	Basement Floor	Static Groundwater		

**Indoor Vapor Sampling.** If indoor vapor measurements were taken, describe the sampling methods and explain why the methods provide representative sample.

Groundwater Elevations
Identify the methodology and device used to determine static groundwater levels. Explain any anomalous measurements or fluctuations in water levels with special emphasis on those which may alter general groundwater gradient or flow direction.
Describe the benchmark used to survey for groundwater surface elevations, including its location and elevation.
If water levels were corrected due to the presence of free product, describe the method used to determine the static water level.

### RECEPTOR SURVEY:

[illegible]

### AFFECTED PROPERTY OWNER TABLE

List all properties within any Receptor ID Plume and under the "Z" (zoning) column, provide the zoning for each property with either "R" for residential or "NR" for nonresidential; mark "Y" or "N" regarding whether that property owner was contacted to determine if there is a drinking or non-drinking water well on their property; and provide the date the property owner was contacted. This page may be duplicated.

	Z	Property Owner Name	Property Address	Owner Mailing Address
1				
		Contacted? Y / N Date: / /		
2				
		Contacted? Y / N Date: / /		
3				
		Contacted? Y / N Date: / /		
4				
		Contacted? Y / N Date: / /		
5				
		Contacted? Y / N Date: / /		
6				
		Contacted? Y / N Date: / /		
7				
		Contacted? Y / N Date: / /		
8				
		Contacted? Y / N Date: / /		
9				
		Contacted? Y / N Date: / /		
10				
		Contacted? Y / N Date: / /		
11				
		Contacted? Y / N Date: / /		
12				
		Contacted? Y / N Date: / /		

**Well Survey / Contact Method.** Identify the method (on-site well survey or letters) for surveying the area within 300 feet of the sources or within the largest receptor identification plume (whichever is smaller). If letters were sent, provide a copy of the letter in Appendix 23 and state how many letters were sent and how many replies were received.

<b>COMMINGLED PLUME DISCUSSION</b>
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<p>If contamination at the site appears to be commingled with another site provide the owner name and address, and if assigned by the IDNR, the Registration and LUST numbers. If the site does not have a Registration or LUST number, provide justification for an off-site source in the section below.</p>
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<b>OFF-SITE CONTAMINATION SOURCE SUPPORT DISCUSSION</b>
---------------------------------------------------------

<p>Provide a detailed justification for any conclusions concerning off-site contamination sources.</p>
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<b>Free Product</b>
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<p>Indicate whether free product has ever been observed at the site and in which wells. If the site has a history of free product, indicate the date the last "Free Product Recovery Report" was submitted. Discuss the status and effectiveness of the free product recovery system.</p>
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Enclosed Space / Conduit Survey							
Conduit Number (on map)	Description (main or service?)	Construction Material	Conduit Backfill Material	Slope of Conduit	Burial Depth	Relationship to Groundwater Level	% LEL
Example 1	Sanitary Sewer Main - 1st & Main accessway	concrete	sand	west	5 feet below surface	2 feet above groundwater	7
Example 2	Basement of Smith residence	cement	NA (Not applicable)	NA	base 8 feet below ground	1 foot below groundwater	33
Example 3	On-site Water Service	PVC	gravel	south	5 feet below surface	2 feet above groundwater	NA
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
<p><b>Survey contacts.</b> Provide the name and address for each public entity and adjacent property owner contacted to determine enclosed space and conduit details and locations. Provide the date of the most recent enclosed space / conduit survey.</p>							
<p><b>Vapor History.</b> Describe any historic and current problems with vapor accumulation in confined spaces. Indicate the date(s) and where vapors were noted. Describe the measures taken to abate the condition and the current status.</p>							

Surface Water Survey			
Surface Water Name	Classification - designated or general use	Description	Visual Observations
Example 1 - Red River	designated A, B(WW)	river	no sheens or residue observed
Example 2 - no name	general use	drainage ditch to the east	Residues noted on bank. Appeared to be non-petroleum. Lab data confirmed no hydrocarbons.

Surface Water Sampling Analytical Data (µg/L)							
(This previously collected data may not be used to clear the surface water pathway)							
Sample Location	Date Sampled	Group 1				Group 2	
		B	T	E	X	TEH-D	TEH-WO

**Surface Water Survey.** Explain how the surface water survey was conducted. If surface water samples were collected, describe the sampling methods. Provide a justification for taking samples.

**RISK JUSTIFICATION AND CORRECTIVE ACTION PROPOSED:**

**Groundwater Ingestion Pathway**

**Groundwater Vapor to Enclosed Space Pathway**

**Groundwater to Plastic Water Line Pathway**

**Surface Water Pathway**

<b>Soil Leaching to Groundwater Pathway</b>
<b>Soil Vapor to Enclosed Space Pathway</b>
<b>Soil to Plastic Water Line Pathway</b>

**MONITORING PLAN:**

Soil Gas Monitoring Plan Comments/Justification

[illegible]

